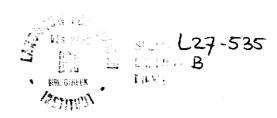
# PACIOLI 2

On innovation management in farm accountancy data networks

Reflection paper

March 1996





Agricultural Economics Research Institute (LEI-DLO)

#### **ABSTRACT**

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This is the second of four reflection papers to provide suggestions for the decision making on the further development of the RICA. RICA runs the EU FADN (Farm Accountancy Data Network) which gathers farm data EU-wide to support agricultural policy making. The reflection papers are submitted to the management committee of the RICA by the concerted action PACIOLI. The concerted action aims to improve the quality of agricultural accountancy and FADNs. The focus of this paper is on the management of innovation.

This reflection paper is based on the papers presented during the second PACIOLI workshop. Exploring differences in farm accounting and successful innovations in FADNs will be helpful in assessment of future potential for further innovation. The analysis of the innovation process in RICA stresses a need for more flexibility. This flexibility is really necessary now that policies are changing and the EU is widening.

Farm Accountancy Data Networks/Innovation management/Farm accounting/ Process model/Stakeholder analysis

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'Our own society is the only one which we can transform and yet not destroy, since the changes which we should introduce, come from within'

Claude Lévi-Strauss (World on the wane)

# **SUMMARY**

This is the second of four reflection papers to provide suggestions for the decision making on the further development of the RICA. The reflection papers are submitted to the management committee of the RICA by the concerted action PACIOLI. The concerted action aims to improve the quality of agricultural accountancy and FADNs. The focus of this paper is on the management of innovation.

First some concepts in innovation management are identified. Innovation needs to be distinguished from an evolutionary adaption and a revolutionary change. In innovation theory several stages are identified. The PACIOLI project only covers the first stage; strategy development.

Second innovation at farm level is discussed. Differences in farm accounting between member states are explored. Important factors explaining these differences are market and institutional factors. A profound knowledge of these factors and of other local circumstances is a key factor in successful innovation. Therefore it will be hard to support innovation at farm level from the top of the RICA organisation.

The International Accounting Standard Committee (IASC) started to develop a specific standard on accounting for agriculture. RICA is not yet very much involved in such standardisation efforts, but it seems to make sense to do so because the RICA-committee is in a certain sense itself a standard setting body.

Accounting is probably not a favourite management tool of farmers. Their interest is mainly focused on the bio-technical process, while accountancy data focus on the economic and financial process. A method to bridge this gap is to integrate technical data and financial data in one information system.

Third recent innovations in FADNs are described. A short overview of successful innovations in several FADNs is given, because these experiences can help to foster innovation in the future. Especially changes in the demand by users of the FADN seem to have a driving force in the reported innovations. Examples of innovations initiated by policy makers and researchers (the most important users) are given.

Fourth the institutional aspects of the RICA are discussed. The second PACIOLI workshop used the framework of Information Engineering to try to identify the factors that might influence the process of innovation in a FADN. This will be helpful in assessment of future potential for further innovation. For strategical (information) management purposes, process models were made that describe the current situation of the FADN. In addition a stakeholder analysis has been carried out. The process model and the stakeholder analysis for RICA are described extensively. Process models identify activities that are common between member states and the EU's RICA. Hereby areas for potential

cooperation can be identified, e.g. in innovation or in software development. One step further is the use of the process model to outsource some of the activities. The mission of the RICA-unit can thus be compared to the activities carried out. Stakeholders are those persons or organisations that have an influence one way or another on the organisation, in this case the FADN. In discussing innovation it is necessary to have an overview of the possible influence that stakeholders might have on the innovation traject, positive as well as negative. It must be explicit if and how the various stakeholders are involved in the innovation traject and what their role might be.

At an abstract level, the conclusion based on the process models and the stakeholder analysis is that two types of FADNs can be identified. The extreme types could be called 'type X' (ministry buys farm accountancy reports) and 'type Y' (research institute gathers farm data). From the point of view of the Ministries of Agriculture, the 'type X' FADN has 'low cost - low value', while the 'type Y' FADN has 'high risk - high value'. In reality in most member states aspects of both types can be found. Both types have their particularities but they also have a lot in common and one type is not necessarily better than the other.

Concluding the analysis of the innovation process in RICA stresses a need for more flexibility. The ungoing trend to gather all the data variables for all 65.000 farms in whole Europe makes less and less sence. It hurts innovation and leaves the Commission as well as the research community with an outdated set of data.

# 1. INTRODUCTION OF PACIOLI

This reflection paper 1) is one of the deliverables of the concerted action in the EU's AIR-Programme, called PACIOLI (Panel in ACcounting for Innovation, Offering a Lead-up to the use of Information modelling). PACIOLI brings together scientists from several member states, who are interested in farm accountancy, farm information systems and agricultural policy. The objectives of the concerted action are:

- improvement of the quality of accountancy and FADN data;
- \* stimulation of the use of accountancy and FADN data;
- improvement of information management in FADNs;
- improvement of cost effectiveness;
- \* asses the need for and feasibility of projects for innovation of accountancy and Farm Accountancy Data Networks (FADN).

  In the concerted action four workshops will be organized, respectively on:
- a) information analysis;
- b) accounting and managing innovation;
- c) need for change;
- d) suggestions for continuation.

The papers presented in the first two workshops are published (see Beers et al., 1995a and Beers et al., 1996a) as they contain interesting information for scientists, accountancy organizations and software developers in the member states. The papers are also summarized in summaries that contains the conclusions and the highlights of the extended report (Beers et al., 1995b and Beers et al., 1996b).

In addition to these papers the results of each workshop in the concerted action are used to provide the RICA-community with a so-called 'reflection paper' that deals with a special issue. The purpose of these papers is to provide suggestions for decision making on the further development of the FADN, based on sufficient background from the workshop papers. The reflection papers are submitted to the management committee of the RICA. The issues of the four reflection papers are determined by the coordinator of PACIOLI and the head of the RICA-unit DG VI A/3.

More information on PACIOLI can be found in Beers, 1996.

The paper is written by Krijn J. Poppe and George Beers. The authors work at the Agricultural Economics Research Institute (LEI-DLO) in the Hague. George Beers is project leader of the concerted action PACIOLI. Krijn J. Poppe heads the Dutch delegation in this concerted action and represents the Netherlands in the management committee of the EU's FADN (RICA). The paper benefited from discussions in and after the second PACIOLI-workshop.

# 2. MANAGING INNOVATION

Primary objective of the PACIOLI project is looking for the needs for and possibilities of innovating the FADNs. The FADNs at national level but moreover at EU level, suffer from a severe complexity, organizational, political as well as at the operational level. Establishing innovation in this complex environment with a variety of stakeholders requires a structured approach; the innovation process needs to be managed. At this place it might be clarifying to identify some concepts in innovation management as they occur in PACIOLI.

### 2.1 Innovation and change

The objective of innovation management is the innovation process that results in an 'innovation'. Innovations can be considered as a drastic change within a particular system; it needs to be distinguished from an evolutionary adaption of the system and from a revolutionary change of the system (figure 2.1). In a certain sense this is comparable with changes in the Common Agricultural Policy that also can be labelled as 'status quo', 'reform' and 'radical reform'.

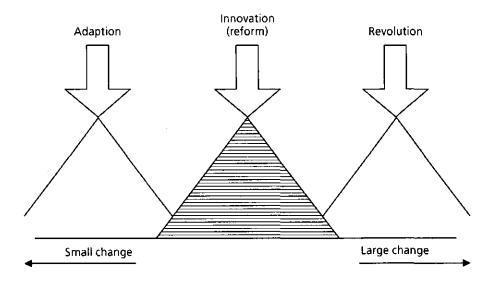


Figure 2.1 Innovation positioned between evolution and revolution

The impact of an innovation (a reform) is more drastic than adaption of the system, it deals with more or less fundamental changes in the system. In the PACIOLI context innovation stands for more than the adaption of e.g. data definitions or harmonizing the samples. One could assume that creating an environment in which these type of adaptions can be rather easily established, might need organizational changes that can be considered as reform. On the other side of the spectrum of change revolution is identified. This differs from innovation in the sense that revolution implies something like 'throw away' the old system and create a new one. Innovation in this perspective exploits the strong points of an existing system and is an attempt to improve it on the weak points. In the PACIOLI context the starting point is that policy makers at national and EU level need information that is based on farm level data and that FADN-like institutions are required to supply this information.

Where revolutions are often prepared by a small group of key-persons, and adaptions demand only a small amount of energy from all the persons involved, a reform or innovation asks for an important group that carries out change management. The concerted action PACIOLI is a breeding place for such change management.

## 2.2 Stages in innovation

In innovation theory usually several stages are identified. In each stage different activities take place in which different people (e.g. management levels) are involved and in which different management methods have to be used. The steps in the innovation process that are often identified are:

- Strategy development;
- Innovation plan;
- Definition;
- Development;
- Preparation;
- Implementation.

To understand the objectives of PACIOLI it must be clear that PACIOLI covers only the first stage; the strategy development. The result of PACIOLI will be proposals for projects in which specific innovations can be worked out according to the successive stages.

The PACIOLI project also does not provide the motivation and the energy (that is often dependent on stress built up by the current situation) for the stakeholders and the RICA-network itself to carry out the change management.

### 2.3 Activities in innovation strategy development

The activities that are usually part of the strategy development stage in the innovation process are represented in figure 2.2. The first step in this stage can be described as 'creating consciousness'. In terms of PACIOLI, the first and the second workshop were dedicated to this with discussions about the need for innovation. The various motivations were identified, the actual situation has been described and some first ideas on possibles directions for innovation have been dropped. The stakeholder analysis in the second workshop created awareness of the external environment and the way the FADNs are influenced by external agents. The external environment includes agents development that can be influenced by the RICA-system, and those that can not be influenced. The second workshop showed that it makes sense to classify stakeholders into four categories (table 2.1) depending on the fact if stakeholders have the same vision on the developments and trust the organization. Stakeholders can be classified as 'friends' for one innovation and as 'enemy' for another. Especially opponents and potential allies can be turned into supporters of an innovation by starting to interact with them.

Table 2.1 Classification of stakeholders

	common trust	no common trust
same vision / expectation	friends	potential allies
contrary point of view / expectation	opponents	enemies

Objective of the third PACIOLI workshop will be generating ideas for innovation and a first selection of ideas. The last workshop will be dedicated to work out some of the selected ideas and prepare proposals for innovation projects.

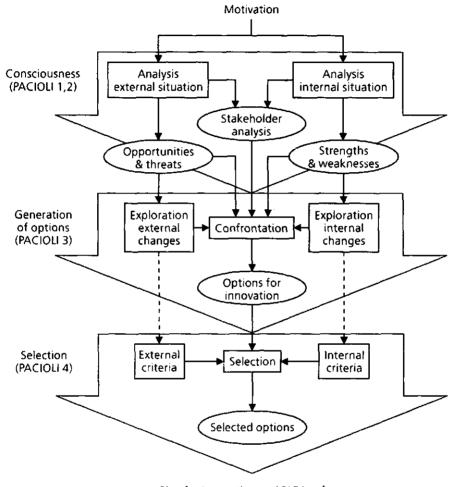
### 2.4 Topic of this paper

The focus of this reflection paper is on the management of innovation, not on the direction of the innovation; a very relevant part of the external analysis.

The next section describes the situation and developments at farm level. Based on data from the member states involved in PACIOLI, it is shown that farm accounting is influenced by several local circumstances. This means that it will not always be easy to copy successful innovations from one region to another.

Section four describes innovations in some of the national farm accountancy data networks. Successful innovations as well as the need for innovation are described.

Section five concentrates on the institutional aspects of the RICA and explores the influence of the (local) institutional structure on innovation. That structure is important to understand innovation and to become aware of needs for organizational adaptions.



Plan for innovation and RICA-reform

Figure 2.2 General scheme of activities in the strategy stage of the innovation and RICA-reform process; this represents the scope of the PACIOLI project

# 3. INNOVATION AT FARM LEVEL

#### 3.1 Introduction

This section focuses on innovation at farm level. Differences in farm accounting between member states are discussed first. Secondly we turn to innovations in accounting methodology. The third topic is the interpretation of farm accounting data by farmers.

### 3.2 Differences in adoption of farm accounting

There are large differences between countries in the adoption of accounting and farm accounting software. In a paper on the adoption of farm accounting software, Poppe (1996b) argued that market and institutional factors could be important factors in explaining these differences.

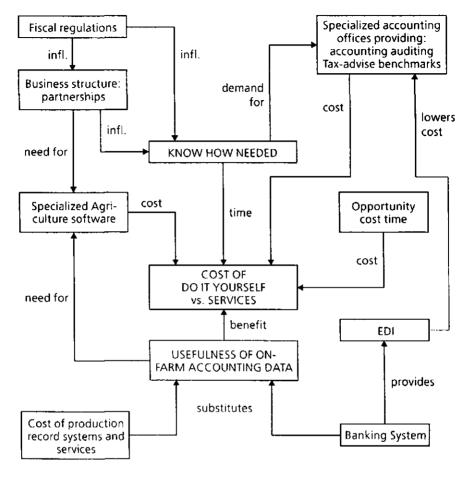
Some of these factors are given in table 3.1. They include facts like: an obligation for fiscal bookkeeping, the availability of production records, the complexity of (tax) regulations and ownership structures etc. Such factors explain the need for accounting, be it for management purposes or as an obligation by (fiscal) law.

Accounting can be done by the farmer himself (on a personal computer or by more traditional methods) or can be handed over to a professional accountant. Once again institutional factors (like the complexity of fiscal regulations) can play a role. But also economics are at work here: competition between banks (providing cash flow statements), production records and accounting as a source for management information is influenced by the degree of specialisation and the availability of electronic data interchange (EDI). For the Netherlands these influences can be illustrated with figure 3.1.

Table 3.1 Facts \*) on farm accounting

	unit	N.	BE	FI	FR	SP	SW	¥
Number of farms in country	# (*1,000)	120	75	120	800	006	06	240
Farms with on-farm PC	* * *	40,000?	7	17,500	50,000	5,000	7,000	35,000?
Farms with bookkeeping: on own PC Fiscal bookkeeping	<b>±</b> #±	8,000	<2,250 <2,250	10,000	30,000	10,000 <1,000	all >6,000	ii
obliged by law?	yes / no	yes	00 12:4	yes	yes	OU .	yes	yes
Complexity of ownership situations	high/low	e id	, wo	<u> </u>	5 <u>8</u>	P de id	ngid High	gi d
Specialized agrarian bookkeeping software available on the market?	# ou / sa /	ves 3	ves 2	ves	ves >10	, yes	, ve/s	, ve
Farms with production record system Comparison of results between	<b>.</b> ##:	40,000?	yes	30,000		000'6	}	<u>.</u>
farms common?	yes / no	yes	yes	9	o C	yes	yes	9
Specialized agrarian accounting offices?	#:	52	151	several	200	30	×100	20
Average 'out of pocket' accounting								
costs per farm with bookkeeping	ECU	2,200	2,350	268	2,500	240	800/200	6,000
Specialized agricultural banks	*	-	7	-	1 to 2	m	-	0
Market share specialized banks in	%	8	75	70	06	40	45	0
the agricultural sector EDI services available?	yes / no	yes	yes	yes	yes	o C	yes	9

\*) result of estimations by experts for the 2nd PACIOLI workshop. Interpretation of definitions could be different between countries.



infl. = influences

Figure 3.1 Factors influencing the low adoption of on-farm accounting software in the Netherlands

The data in table 3.1 can not be explained easily by current expertise, even if we accept the fact that some of the data are only best guesses and that the interpretation of the headings varies between the countries ('unharmonized data definitions'). It is also unclear if a situation where more farmers have accounts or use on-farm PC's for accounting is attractive in the sense that it leads to better farm management. This is often assumed (even in EC Regulations that prescribe accounting if modernisation aid is accepted), but there is not much research available on this assumption.

This lack of knowledge on the factors that explain the use of accounting and accounting software by farmers hampers the process of innovation. As farm accounting is heavily influenced by local circumstances, it will not always be easy to copy successful innovations from one region to another. For the RICA-system, as far as it depends on farm accounting practices, this implies that demands for new types of data (e.g. on environmental issues) or quicker data delivery will be easier to meet by some regions than others. It also implies that it is hard to support innovation from the top of the RICA-organization, as a good know-how of local circumstances is a key factor in successful innovation.

### 3.3 Developments in accounting methodology

Agricultural accounting techniques that are used in many farm accountancy data networks differ from those used in fiscal accounting or those used outside agriculture. This is partly due to the characteristics of agriculture, where farm comparison is important, and farms differ in the relative use of family inputs. Hill (1991) describes the current know how on indicators for income, profitability and viability of farms.

Making use of this expertise is not always easy. It has been suggested earlier (Power et al., 1989) that there could be a certain lack of harmonisation in the RICA. A paper by Williams (1996a) shows that the application of current cost accounting, especially in herd valuation, is far from easy. Debate on the split of the increase in value in a holding gain and an income component is easily possible. And although current cost accounting is nowadays not very much in vogue outside farming (if it ever has been), it seems to have given a more realistic representation of the costs of owning and using fixed assets in the RICA.

An interesting development in the accounting methodology is that in several countries agricultural accountants are starting to compare their concepts with those used by the accounting profession in non-agricultural cases. Several factors explain this trend: (1) more formal training in the (conceptual frameworks of the) accounting profession, (2) larger farm businesses and (3) accounting offices and banks that diversify to non-agricultural clients and the other way around.

On certain points, like the use of current cost accounting, the valuation at market prices and notional charges for family inputs, farm accounting and the RICA departs from GAAP - General Accepted Accounting Practices (Dedman, 1996). The financial accounting statements used in RICA are sometimes ill-defined. The profit and loss account measures the income, but not the efficiency (Hill, 1991; Poppe 1992). The introduction of tradeable quota seems for a long time to have been overlooked by the RICA. It has also been argued (Poppe, 1993) that the cash flow statement used by RICA could benefit from recent literature that discusses IASC's Exposure Draft 36 'Cash flow statements'.

It is likely that the debate between agricultural accounting practices and GAAP will intensify in the coming years. This is especially true now that the International Accounting Standards Committee (IASC), which is the main ac-

counting body involved in the setting and promotion of accounting standards in an international context, started to develop a specific standard on accounting for agriculture. Although the RICA is not yet very much involved in such standardisation efforts, it seems to make sense to do so: the RICA-committee is in a certain sense itself a standard setting body and it will be effected by IASC decisions anyway 1).

## 3.4 The interpretation of accounting data by farmers

Accounting is probably not a favourite management tool of many farmers. Table 1 showed that many farmers do not use it, if they are not obliged to keep books. The characteristics of agriculture (like small holdings with marginal remuneration, not necessarily maximizing profits) can partly explain this (Poppe, 1991).

Some authors have (correctly) argued that researchers and accountants are also to blame. Christensen, Lund and Pedersen (1984) concluded that the interest of farmers is mainly focused on the bio-technical process and that the use of economic information is defective. That is mainly to blame on the impossibility of farmers to place themselves in accounting and budgetpractices and definitions. As a result of a historical process, the authors stated, these are more over directed too much at research and policy making.

In France, Brossier et al. (1984) made a similar remark: 'In general in France the studies to calculate the profits of farmers to support agricultural policy-making has not favoured micro-economic work. The example of the FADN is revealing'.

The paper by Del'homme and Steffe (1996b) shows that the situation in France has not much changed. They argue that the development of information systems is very much 'top-down': system developers start with a general decision model that leads to an information model and the supply of data in the framework of that model. However to be able to interprete data, decision makers (like farmers) need an interpretation model to give the data a meaning. This interpretation model involves references (or standards) that are not neutral. For example: a solvability (net worth in % of total assets) of 60% has no meaning unless one knows e.g. the type of farming (intensive livestock farms are more indebted than cereal farms with a lot of owned land), the age of the farmer, his cash flow, his risk attitude etc.

The French RICA (and probably this holds for other countries too) is defined as a micro-economic data network to be used at a macro-economic level. Averages calculated from the FADN-data are not necessarily useful as refer-

This would be in line with a Green Book of the Commission discussed in CORE-PER on 15 November 1995, where arguments were given for an international harmonisation between IASC and EU Directives on Accounting. For the moment the PACIOLI-project / Wye College and the Dutch Accounting Organization NI-VRA have established contacts with the Agriculture Steering Committee of the IASC.

ences for farmers, as this asks for a normative step: the farmer (and/or his advising expert) should decide that a certain indicator and a value for this indicator can play the role of a normative standard for his farm. This aks for the definition of a peer group, the definition of a score card and the comparison of data, like in benchmarking exercises outside agriculture. Work done by the ENITA (Del'homme and Steffe, 1996c) in France and the LEI-DLO in the Netherlands (Hennen, 1995) shows that expert systems can play an attractive role in bridging the gap between accountants and farmers. However this involves more explicit user involvement in information systems development and a 'bottom to top approach'. This could also imply that FADN-users and cooperating farmers have partly a different need for data.

Another method to bridge the gap between accountants and farmers is to include technical data (fysical data, production records) and financial data in one (accounting) system. This is now more and more possible, as technical as well as financial data are available in electronic form. The integration of these types of data in one application can improve the understanding of financial data, and the economic decision making by farmers.

Such an integration could also be useful, or even necessary, if farmers' records have to be audited to monitor their individual environmental performance, e.g. to receive subsidies or to prevent penalties (Breembroek et al., 1996). Product data flows in the total agricultural chain (e.g. to increase the value added by closer cooperation in the product chain and to direct consumer response to agricultural producers) will also lead to a link of technical and financial data. The FADNs could be useful instruments to provide monitoring reference information (the base-line situation) to such product data chains (Meeusen-van Onna et al., 1996).

# 4. USERS AND INNOVATION IN FADNS

#### 4.1 Introduction

In several countries successful innovations in the FADN have been carried out or are currently implemented. Some of these were presented in the second PACIOLI workshop. As these experiences can help to foster innovation in the future, this section provides a short overview. Especially changes in the demand by users of the FADN seem to influence the reported innovations. Agricultural policymakers are the main target of the FADN, so the next section discusses some successful innovations in this field. We then move on to a few examples of data demand on related policy issues. The section ends with a broadening of the use of FADN data towards other groups, especially in (policy-) research.

### 4.2 Agricultural policy

In Sweden (Persson, 1996) the FADN has been severely influenced by the changes in agricultural policy. Before 1990 this policy was based on automatic compensation for increased input prices and higher incomes in other sectors. Afterwards the agricultural policy was reformed with a reduction of government intervention. This decreased the demand for certain agricultural statistics. However, with an eye to future membership of the EU, the FADN was not abolished.

The European FADN also reacted successfully to changes in the agricultural policy. Where the FADN was originally intended to provide data directly linked to the political process of price determination (the so called 'objective method'), the FADN moved to become a representative micro-economic tool for policy-analysis that could not be missed in the current policy context (Robson, 1996).

As a policy maker at the Dutch Ministry of Agriculture, Nature Management and Fisheries, Van Leeuwen (1996) identifies 5 stages in the policy process:

- 1) individuals and lobby groups perceive an undesirable development;
- 2) the issue is placed on the political agenda, especially by political parties;
- 3) possible solutions are identified and evaluated ex ante;
- 4) a solution is chosen;
- 5) a monitoring system gives information on the gap between the actual situation and the political goal.

The FADN is in essence a monitoring system (stage 5) but is also of help in step 1, 2 and 3.

Van Leeuwen (1996) argues that the FADN should more rapidly adapt to changing policies, especially to play a role in the stages 1, 2 and 3. Data on regional policies, nature conservation, environment and agricultural practices should be included in the FADN to develop it into a complete farm and moreover in a rural information system. Flexibility, accessibility of data and data-definitions and timeliness ('multinationals can also publish their annual accounts in a reasonable time') should be improved.

### 4.3 New policy issues

Work on some of these topics is already underway. Especially environmental issues are on the agenda in several countries. In Spain proposals are made to include environmental variables in the RECAN (the Spanish FADN), and the Basque country already has some positive experiences in this field (San Juan, 1996). However special attention should be paid to collect data that is specific to Mediterranean agriculture and forestry. An analysis of forces around such an innovation (Merino-Pacheco, 1996) shows that there are a lot of positive elements to build a consensus on the 'greening of RICA'.

Mineral balances are one example of an environmental data demand. Based on RICA-data these have been estimated and published for the EU-12 (Brouwer et al., 1995). Pirttijärvi (1996) shows that this innovation also makes sense and can be carried out for Finland.

Taking into account that EU- and national FADN data has also been used to estimate the use of pesticides in agriculture (Brouwer et al., 1994) the question arises if a more coordinated gathering and publication of environmental information could help to innovate the FADN in the direction indicated by Van Leeuwen (1996) and others.

A second theme on which work is underway, is forestry. With the EU-en-largement the area of woodland, and of woodland on agricultural holdings, increased strongly. Hyttinen (1996) addresses the problems in forestry accounting. These can be distinguished in three areas: business economics (including methods of calculating income from standing timber), statistics (sampling, representativeness) and organizatory arrangements. Several actions to create a pan-European forestry accountancy network have already taken place. A IUFRO project group published guidelines for the presentation of data about the profitability of private forestry. A pilot study is going on for analysing costs and revenues and a concerted action is under evaluation.

In new member states the new agricultural policy and the need for harmonisation of the FADNs has of course also a big impact on the FADNs and is a clear example of a reaction of the FADNs to new policy demands (Sirén, 1996; Bolin et al., 1996). It is remarkable that these actions, especially on harmonisation, are carried out during or after the assessment negotiations. Taking into account the huge need in the EU tor micro-economic data on Central and East European countries it makes sense to foster the establishment of agricultural accounting and FADNs in a much earlier stage.

#### 4.4 Research

Besides policy makers, there are other FADN-users that demand innovation. One of those groups are researchers that use FADN data as a basis for economic model building. Until now the FADN data have been under utilised for this purpose. Bailey (1996) identifies several reasons: the size and the complexity of data manipulation, econometric problems and the possibility of bias within the sample. The lack of physical data, and especially of input allocation, restricts the ability of researchers to estimate economic production parameters that help to understand the impact of commodity specific support policy changes.

New developments in software could at least help to solve the problems of data management by unexperienced users (Bonati, 1995). Software with a client-server approach and a Windows GUI (Graphic User Interface) has been built by INEA to query the national FADN database. This helps users to extract the most frequently required tables.

# 5. INSTITUTIONAL ASPECTS OF THE RICA

### 5.1 Introduction

Previous sections highlighted innovations in farm accountancy and farm accountancy data networks that are carried out in some of the member states. In analysing accounting at farm level (table 2.1, figure 3.1) we concluded that a lack of knowledge on the factors that explain the use of accounting and accounting software by farmers hampers the process of innovation.

The second PACIOLI workshop used the framework of Information Engineering to try to identify the factors that influence the process of innovation in the FADN. This will be helpful in assessment of future potential for further innovation; we have to use the lessons we learned. For strategical (information) management purposes, process models were made for the FADNs in the member states involved and for the EU's RICA. These models describe the current situation. In addition a stakeholder analysis has been carried out. The results are discussed in more detail in the next sections.

#### 5.2 Process model

As an example, and as a starting point for future innovations, figure 4 provides the process model for the EU's RICA. The process-model contains 9 important functions:

- strategic planning;
- data management;
- operational management;
- receiving data;
- weighting data;
- distribute data;
- \* making analysis;
- making forecasts (rfs).

Strategic planning is not a very structured process, and the initiative is not always with the RICA-team. Parts of it (EU enlargement, policy developments) have to do with the interaction with EC-policy. This could result in proposals to change the data collection. Data management consists of activities that guard the methodology of RICA, including the gathering of some external data like exchange rates. The real data handling is carried out in the functions 'receiving data' and 'weighting data'. Data management is more focused on the management of data-definitions.

Operational management includes the 'team-work' of the RICA unit A/3. Typical activities for the Commission have to do with the organization of RICA-

meetings and with keeping in touch with the member states. The function of the management of the information system is straight forward. It should be noted that some of these activities (especially maintenance on software) is sourced out to specialised companies.

The activity of 'receiving data' includes the maintenance of the controlsoftware. This is a bit arbitrary, as it could also be seen as an activity that belongs to the management of the information system. It has been put here as it calls for a lot of specialist know how, and it is improved continuously in close connection with solving the detected errors. Something similar is the place of the process 'distribution of control software'. This could also be seen as a part of the 'management of member states' or as a part of a (not identified) function 'distribute data and software'. Taking into account the way the work is organized at this moment, the process-model is a good description.

The function 'weighting data' includes the collection of data on the observation field. One could argue that there is some overlap between 'comment selection plan/report' and 'control representativity'. However, at the moment comments are not made frequently and are often restricted to a small discussion in the RICA-committee. Quite apart representativity is checked in the unit with an eye to the analysis made.

The function 'distribute data' is clear: it includes the publishing of electronic tapes to member states and (from time to time) a statistical publication. The support of external users includes the creation of (special) tables on their request.

The function of 'Making analysis' includes several activities that have to do with the key production activity of the unit: to perform analysis for the DG VI hierarchy. Although there is probably no clear intake-procedure for new requests a separate process has been modelled: in connection with the operational process 'weekly workplanning' the head of the unit is involved in the decision to carry out an analysis or not. 'publishing' and 'after sales service' should be taken with a grain of salt: most of the analysis are not formally published, even not after some time. At best they will be presented as an RI/CC document to the RICA-committee. After sales service is used as a descriptor for activities as the presentation of the paper to policy departments and answering their additional questions.

The process 'subcontract a study' has been placed in this function because some studies are carried out by contractors. It should be noted however that contractors have also been or are involved in studies on methodology (e.g. weighting, data quality) and on new data requirements (e.g. a consultant on non-farm income). An alternative model would be to include a decision on subcontracting in several processes (receive requests, weekly planning) and to have a process 'contract and monitor subcontractors' under operational management.

The function 'making analysis' includes so called scenario-simulations. In practice a lot of the activities for these studies are equivalent to those of 'normal' studies. The main difference is that in scenario-simulations additional assumptions are made on future circumstances (e.g. higher yields, lower prices) and on farmer behaviour (e.g. lower prices will lead to a reduction of inputs).

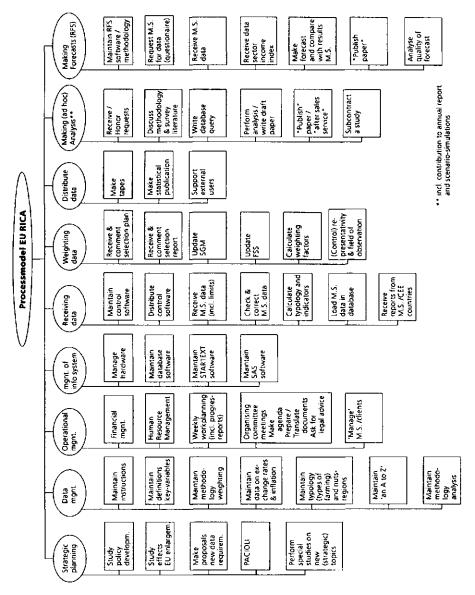


Figure 5.1 Process model RICA

A special type of analysis are the income forecasts for the current year by the Rica Forecasting System. This has been modelled in a special function.

The process model for RICA is of course a bit different from those of the member states. For instance the Dutch (Poppe, 1996a), Finnish (Tiainen, 1996), French (Delhomme & Steffe, 1996a), Basque (Astorquiza, 1996), Swedish (Bolin & Gustafson, 1996), English (Williams, 1996b) and Belgian (Taragola & Van Lierde, 1996) process models have special functions for accounting. But most functions are more or less similar: e.g. all of them have strategic and operational management in common.

Partly this similarity could be the result of the organization of the workshop: the Dutch model was provided to the participants as an example. Secondly some groups clearly made the model as a description of all the processes of the FADN in the country, not specially those of the liaison agency. For instance the process model of the UK's MAFF will be different from that of the Universities; the current UK process model includes both levels.

Process models identify activities that are common between member states and between the member states and the EU's RICA. Hereby areas for potential cooperation can be identified, e.g. in innovation or software development. Activities like 'maintain control software' or 'maintain methodology weighting' are found in most process models. Until now the RICA-committee does not allocate much of its time to share expertise between member states in these fields. More cooperation in similar precesses between national FADNs could lead to a higher cost effectiveness, due to economies of size. Experiences, methodology, datamodels and even software could be exchanged. This is often thought impossible due to the differences in local circumstances (see chapter 3) and the language-problem. However this view is exaggerated as it focuses too much on current software for local accountants. It is less true for software used by academic staff (who are often used to english software like Lotus 123, SAS. SPSS etc.), and it is probably not true for the development of software. Today's standards for software development start with the creation of detailed process and datamodels, which are the basis to generate (partly automatically) software. The process and datamodels can easily be translated and used as a reference model to be adapted to local circumstances. This is a similar activity as the use of reference models for accounting in general (which are for sale on the market) to adapt them for an agricultural accounting package.

One step further is the use of the process model to outsource some of the activities. The RICA itself could be used as an example: the previous reflection paper (Poppe and Beers, 1995) stated that the mission of the RICA-unit in DG VI is to provide (often confidential) policy information to DG VI and not to improve agricultural accounting or to make statistics. Hence the name of DG VI A/3: analysis of agricultural holdings. The RICA is a tool for that purpose, not an end. The point was made that the RICA-unit needs control over the instrument to fulfill its function and that harmonized changes in the instrument cost a lot or resources (time) or are nearly impossible. This carries the risk that it threatens the mission of the RICA-unit one way or another, due to too much time dedicated to data-management or due to outdated data.

This dilemma could be made more clear by the process model: the mission of the RICA-unit is closely correlated with the functions 'making analysis' and 'making forecasts' (figure 5.1). However, most of the time available is dedicated to the functions 'data management', 'management of information systems', 'receiving data' and 'weighting data'. Probably the FADNs in the member states face similar situations.

A potential solution for the EU's RICA is to see if quality still can be guaranteed if some of the activities that are not the core-business, are hived off. At least part of the functions 'data management', 'weighting data' and 'distribute data' can be carried out by others. This is already (partly) done for software development, making publications (the last statistical publication was made by France), maintaining the methodology of weighting (supported at the moment by the LEI-DLO) and special studies.

The process model can also make clear that such an outsourcing has effects for the other activities: the function 'operational management' (financial management and planning) has to be strenghted if one chooses for more subcontracting and management and less in house processing of data.

### 5.3 Stakeholders analysis

Stakeholders are those persons or organizations that have an influence one way or another on the organization, in this case the FADN. In discussing innovation it is necessary to have an overview of the possible influence that stakeholders might have on the innovation traject, positive as well as negative. It must be explicit if and how the various stakeholders are involved in the innovation traject and what their role might be. Figure 5.2 shows the 15 stakeholders that have been identified for the EU's RICA. Nine of them are part of the European Institutions, ranging from departments in DG VI to other European Institutions like the Court of Auditors or the European Parliament. Within DG VI there is a large range of stakeholders, ranging from the legal service and the translation service up to the policy units and the top of DG VI.

Outside the European institutes, another 6 types of stakeholders have been identified. Some of them are users (COPA, scientific world, private companies), others are of political importance (ministries of agriculture in member states, COPA).

In some member states the RICA data are gathered and delivered to Brussels by the Ministry of Agriculture. In other countries this job has been handed over to research institutes or universities. In both cases it makes sense to identify the national data collectors (including private accounting companies that work for ministries or national research institutes) apart from the ministries of agriculture. Probably these two types of organizations are motivated by other aspects (political vs. expert and monetary interests) and this will influence their behaviour, especially towards innovation.

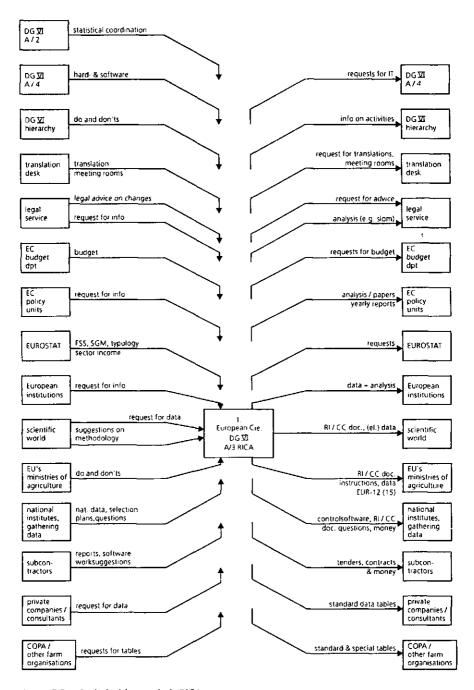


Figure 5.2 Stakeholder analysis RICA

About 50% of the stakeholders are (also) users of RICA-data. This includes organizations as national agricultural ministries and even the legal service that uses data in procedures like the SLOM-case.

Analyses for the member states show additional differences. Some of them are rather small, but significant; for instance the Belgian LEI gives its publications away free of charge, where the Dutch LEI-DLO sells them. This can partly be explained because the Belgian LEI is much more integrated in the government administration, where the Dutch LEI-DLO is nowadays a not-for-profit research organization at arm's length of the government. For the same reason the Dutch LEI-DLO tends to treat Universities as a potential competitor, where e.g. the French RICA makes data available to the INRA through its ARISTIDE system. Even more striking is that in some countries the data is not used for research very much at all.

Another important difference, also with an eye to innovation, is the role of data providors. In some countries independent commercial accounting offices play a big role in gathering the data. That makes it important to analyse their stakeholders and motives. Section 3 of this paper argued that some of them are now interested in using the same accounting methodology as in non-agricultural sectors. In a recent Dutch paper a director of an important agricultural accounting office argued that a joint innovation process in agricultural accounting is hard to establish (Maasdam, 1995). Several reasons for this were indicated:

- \* fixed framework: accountancy is dominated by a fixed, self-controlled framework. Conceptual frameworks are based on external standardising committees. New employees are trained by the profession and departing opinions are not easily accepted. This makes innovation as a reaction of demands by clients more difficult;
- \* investment level: accountancy methods are reflected in information systems. Changes in work processes lead to high costs for new software and a disruption of efficient activities. Training will be needed. So change is most attractive at the time that an old information system is written down and has become obsolete. One of the problems in a joint innovation process is that the individual accounting offices have differences in the modernity of their information systems: one office will have an old system up for replacement, where another will be recently modernized. In such a situation the offices will react differently to proposals for innovation:
- \* the nature of the profession: accountants are by profession a bit defensive, oriented on formal responsibility and accountability. Correctness goes above just-in-time. Long-term comparability of data is important. In recent years problems of liability-issues have dominated the headlines. This nature of the profession does not foster innovation towards providing more advise to the farmers (e.g. management accounting, planning, analysis etc.), as this is seen as a risky form of consultancy.

Maasdam (1995) concludes his analysis with the proposition:

'the formality of the accounting profession (especially in financial accounting), the information technology in the accounting office

and the increasing trends in liability claims, lead to a reinforcing process that hampers changes in agricultural reporting to farmers'.

One aspect not mentioned by Maasdam, but perhaps in the background not unimportant, is that in some regions of the EU, agricultural accounting offices do not face a lot of competition. They are sometimes linked to the local farmers organization and in general farmers cannot easily judge the quality/price relationship of different competing accounting offices. As the accountant deals with data on income and wealth, and those data are seen as quite private in some regions of the EU, there is often a lot of trust involved in the relationship between farmers and their accountant. That makes competition less severe. It implies that the thread of competition is not a big incentive for innovation. On the other hand competition seems to be increasing in some regions (e.g. the Netherlands) and farmers complain about increasing costs. That makes it hard to allocate cashflow gained by the marketpower towards innovation.

### 5.4 Conclusions

The application of the Information Engineering tools to the RICA learned that there are important similarities as well as differences between the member states. At a very abstract level two 'types' of FADNs can be identified. We could call them 'type X' and 'type Y' (table 2).

In an FADN of type X, the data are gathered by a commercial accounting office that provides them (as a byproduct of tax accounts) to the Ministry of Agriculture. The accounting office, and sometimes the farmer, are paid for their service. In this type of FADN the information content is often severely restricted by the fact that the Ministry deals with a number of accounting officies (see above) and that data that are not available in financial tax accounts is rather expensive. These circumstances restrict the collection of additional data. The use of FADN-data is often restricted to the use in the Ministry of Agriculture for policy analysis. Research institutes do not have access to the data. The political culture is often not used to debates in the public domain on sensitive political issues, based on calculations and research carried out by an indepent research institute.

In an FADN of type Y, the data are gathered by a research institute with its own staff. This is probably more expensive, but it also delivers more data, especially on new policy topics, and data that are more relevant for economic research and policy supporting analysis. The FADN is not only focused on monitoring but also on the first stages in the policy process (see section 4.2). Especially as the research institute (and its FADN) is output-financed, the incentive to have relevant data is high as it gives a competitive edge compared to other research suppliers. Then there is also a clear conflict of interest between the FADN and its financing policy makers, that leads to a higher incentive for efficiency. Due to the high information content, farmers are also more interested in providing the data, as they receive more feedback. In this situation innova-

tion is more easy because there is a win/win situation: the FADN can gather a lot of data on the farms without much additional costs (the marginal cost of an extra data item is very low, once the farm is in the accounting system), or even has to do so to guarantee the farmer's cooperation. In a certain sense the Type Y FADN is in a more unstable equilibrium: once that innovation hampers and the cooperation with the farmer is lost, it will be hard to serve the researchers and policy makers; and as a result policy makers could become interested to abandon their support to the Type Y strategy and choose for a low cost - low value strategy with a Type X FADN.

Table 5.1 Two different types of FADN

Aspect	Type X: 'low cost - low value'	Type Y: 'high risk - high value'
Central organization in FADN	Ministry of Agriculture	Research Institute
Type of finance	internal budget	output-related
Data gathered by	buying from accounting offices	own staff
Farmer's participation	is paid	free
Information feedback to farmers	low	high
Interest by farmers	low	high
Data flow and its: - information content - innovation	low tow	high high
Data used by research	incidently	often, and critical success factor
Political culture	data monopolized by ministry; no open access by others	policy advise and consensus building in the public domain
Main role of EDI	can solve lack of interest	can reduce higher costs
Typical example	Germany	The Netherlands

It is not true that large countries have a lot of the aspects of a Type X FADN and smaller ones of a Type Y FADN. The FADN in Italy (the research institute INEA as central organization) and in the UK (Universities playing the role of the research institute) have several characteristics of the Type Y FADN, and the case of Luxembourg fits in the Type X FADN. It is also not true that a central role for the Ministry of Agriculture implies a small role for research: in

France the RICA data are often used by researchers (but it seems that they don't have a big say in gathering additional data).

These examples show that in reality in most member states aspects of both types can be found. Both types also have a lot in common, and one type is not necessarily better than the other. The analysis shows that a type Y FADN is better in innovation, but even that is not necessarily a good thing. It depends on the historical developments, the local circumstances and the current strategic aims of the stakeholders of the national FADN, which of the two types is relevant in a certain region.

Most important to note however is that a process of innovation should take the differences in stakeholders into account and that within each FADN strategic management is necessary to monitor if the organizational choices are still the best in relation to the current and future circumstances and objectives in the agricultural sector.

# 6. CONCLUDING REMARKS

Innovation is a complex process. Innovations in farm accounting and farm accounting data networks are not easy to accomplish. In a report on economic indicators for RICA, Hill (1991) stated:

'RICA seems to provide a classical example of statistical obsolescence. As a data source set up to assist in shaping agricultural policy, it has been left behind through the change in emphasis from one of production to a concern with the incomes of farmers. It has failed to adapt on the new pattern of needs'.

He concluded that 'institutional rigidities' exist and that public choice theory could help to explain this. Poppe (1992) argued that 'the importance of the bureaucratic structure and of the interest of the bureaucracy in impeding or achieving change' is not the key problem. He identified the different positions of the member states as problematic; some have an interest to gather new data and relative low cost to provide them, where others have not and opt out.

The papers presented in the second PACIOLI workshop and especially the analysis provided by the Information Engineering approach (process model and stakeholder analysis) underline this impression.

This analysis of the innovation process in RICA stresses a need for more flexibility. The ungoing trend to gather all the data variables for all 65,000 farms, located from the Algarve to Lapland and with different farm systems and levels of management even within the same region, makes less and less sense. It hurts innovation and leaves the Commission as well as the research community with an outdated set of data.

Changing the RICA from a hierarchical, rigid structure into a flexible partnership seems to have attractive elements. The first PACIOLI-reflection paper (Poppe & Beers, 1995) argued that current data management methods can support such a RICA-a-la-carte. This PACIOLI-reflection paper showed that more emphasis on strategic management of the FADNs and on innovation is required, and that tools for this are available.

At the end of the 2nd PACIOLI workshop Nigel Robson identified the following actions to implement such a strategy:

- discuss priorities with DG VI hierarchy;
- establish and manage working groups on e.g. cost of production, forecasting, farm return (including new data needs), EDP;
- \* obtain cooperation with member states that have a strong interest in publishing and research. Set up an efficient document exchange system and data access conventions (including software).

The relevance for RICA of the results of the 2nd PACIOLI workshop could not have been turned into a better recommendation.

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